

Sundials in the mathematics classroom

In 2008 the Bowland Charity published a DVD that was sent to all schools in England. This DVD contained 21 case studies of mathematics to help make mathematics fun and absorbing for pupils aged 11-14. The aim is to help change pupils' views of maths by increasing their motivation and enjoyment, which should help increase their confidence and their competence. A second aim is to help teach mathematics in a different way.

One of the 21 case studies is about sundials. My bid on getting this branch of mathematics back into mainstream mathematics successfully got through both rounds that reduced the case studies from 400+ to 21.

Details of the Bowland maths can be found [here](#).

To access the case study you need to select 'Run the Bowland player online' from the left hand side menu, then click on 'GO' in The Case Studies box. Then click on the arrow until the Sundials case study appears. From there you can download the materials, which will take some time since there is 277MB of material!

Sundials introduces pupils to the idea of using the sun to tell the time, applying a range of mathematical skills to understand some of the theory and to construct at least one sundial for themselves. A video about sundials provides the context, including footage explaining the history of sundials and how they work. An interview with Harriet James, a gnomonist (someone who makes and repairs sundials) shows how mathematics is essential to the construction of sundials.

The classroom work is differentiated into three tiers. Depending on the route followed, *Sundials* uses symmetry and the drawing of angles, nets, origami, circle work and comparing data. Every route includes reading information from graphs and calculating time. *Sundials* invites pupils to reach out to the clockwork of the heavens!

Since the materials were produced by the Bowland Charity for English schools they are not accessible outside England, but it is possible to purchase the DVD (£200). I believe it is possible (and legal) for anyone in England to download any of the materials.

As well as sundials to cut out and make, the case study includes work on reading graphs (the equation of time), videos (there is an excellent 15 minute video of Harriet James in action, explaining how she uses mathematics in her work), and games to play.

The materials were developed and trialled in several schools (mainly Hampshire) and cold tested under the jurisdiction of the NFER (National Foundation for Educational Research) before release.

The work was presented at the 11th International Conference on Mathematical Education in Mexico in 2008 and is mentioned in the report published by the Institute of Mathematics and its Applications [here](#).

Peter Ransom (Case Study Director)